

**Resource Report 11**

**Table 11.1.3-1**

**Pipeline Class locations along the Mid-Atlantic Express Pipeline by Milepost  
AES Sparrows Point Project**

<b>Milepost (Approximate)</b>	<b>Starting Location</b>	<b>Ending Location</b>	<b>DOT/ASME Class</b>
MP 0.0 – 1.6	Baltimore Co. Maryland	Baltimore Co. Maryland	Class III
MP 1.6 – 9.9	Baltimore Co. Maryland	Baltimore Co. Maryland	Class IV
MP 9.9 - 83.6	Baltimore Co. Maryland	Chester Co. Pennsylvania	Class III
MP 83.6 – 87.5	Chester Co. Pennsylvania	Chester Co. Pennsylvania	Class IV

**Note:**

1. Both DOT 192 and ASME B31.8 have divided pipeline installations into “Location Classes” based primarily upon occupied buildings (population density) near the pipeline ROW.
2. Class study utilized a source pressure of 2080 psig, delivery pressure of 900 psig, 1.5 BSCFD flowrate, 30” ID NPS pipe

## Resource Report 11

Table 11.1.3-2

Office of Pipeline Safety Transmission Pipeline Incident Summary by Cause (1990-2006)

AES Sparrows Point Project

YEAR	Total Incidents	<u>Design Errors</u>  (% of Total)	<u>3rd Party Damage</u>  (% of Total)	<u>Corrosion External/Internal</u>  (% of Total)	<u>Incorrect Operations</u>  (% of Total)	<u>Miscellaneous Other Incidents</u>  (% of Total)
1990	89	22 (25%)	39 (44%)	16 (18%)	NR	12 (13%)
1991	71	4 (6%)	41 (58%)	16 (23%)	NR	10 (14%)
1992	74	9 (12%)	32 (43%)	12 (16%)	NR	21 (28%)
1993	95	15 (16%)	36 (38%)	15 (16%)	NR	29 (31%)
1994	81	9 (11%)	23 (28%)	33 (41%)	NR	16 (20%)
1995	64	13 (20%)	27 (42%)	9 (14%)	NR	15 (23%)
1996	77	8 (10%)	38 (49%)	15 (19%)	NR	16 (21%)
1997	73	12 (16%)	28 (38%)	21 (29%)	NR	12 (16%)
1998	99	19 (19%)	37 (37%)	22 (22%)	NR	21 (21%)
1999	54	8 (15%)	18 (33%)	13 (24%)	NR	15 (28%)
2000	80	7 (9%)	20 (25%)	31 (39%)	NR	22 (28%)
2001	87	12 (14%)	37 (43%)	16 (18%)	NR	22 (25%)
2002	82	20 (24%)	21 (26%)	22 (27%)	1 (1%)	18 (22%)
2003	97	22 (23%)	23 (24%)	25 (26%)	7 (7%)	20 (21%)
2004	123	24 (20%)	30 (24%)	40 (33%)	2 (2%)	27 (22%)
2005	182	16 (9%)	32 (18%)	29 (16%)	4 (2%)	101 (55%)
2006	107	28 (26%)	22 (21%)	19 (18%)	3 (3%)	35 (33%)

## Notes:

1. Information from U.S. Department of Transportation, Office of Pipeline Safety , <http://ops.dot.gov>.
2. NR = Not Recorded
3. Miscellaneous Other Incidents include various events which are not repetitive from year to year.

## Resource Report 11- Reliability and Safety

### Table 11.2.2.1-1

#### Thermal Radiation Calculation Bounding Assumptions

#### AES Sparrows Point Project

Temperature	$\geq 26.1$ °F
Relative Humidity	$\geq 33$ Percent
Wind Speed	$\leq 18$ mph (Note 1)

Note 1: Pursuant to 49 CFR § 193.2057, the wind speed, ambient temperature and relative humidity producing the maximum exclusion distances will be used except for those values that occur less than five percent of the time based on recorded data for the area. In some cases, lower wind velocities have been determined to result in higher heat fluxes, depending on the flame height and the target location (distance from the center of the fire and elevation). In these cases, radiation analyses have been performed at the more conservative wind speed.

**Resource Report 11- Reliability and Safety**

**Table 11.2.2.1-2**

**Thermal Radiation Exclusion Zones for LNG Storage Tanks**

**AES Sparrows Point Project**

Heat Flux Criterion (Btu/hr-ft <sup>2</sup> )	Target Elevation (ft)	Maximum Exclusion Distance From Center of Tank (ft)	Wind Speed (mph)
10,000	0	394	18
3,000	0	737	18
1,600	0	949	15

**Resource Report 11- Reliability and Safety**

**Table 11.2.2.1-3**

**Thermal Radiation Exclusion Zones for LNG Spill Containment Sump**

**AES Sparrows Point Project**

Heat Flux Criterion  (Btu/hr-ft <sup>2</sup> )	Target Elevation (ft)	Maximum Exclusion Distance From Center of Impoundment (ft)	Wind Speed  (mph)
10,000	0	223	18
3,000	0	306	18
1,600	0	366	18

**Resource Report 11- Reliability and Safety**

**Table 11.2.2.2-1**

**Flammable Vapor Travel Calculation Bounding Assumptions**

**AES Sparrows Point Project**

Wind Speed (mph)	4.5
Atmospheric Stability Class	Pasquill-Gifford Category F
Relative Humidity	50%
Ambient Temperature (°F) <sup>1</sup>	55.4 (average of all temperature data)
Surface Roughness Factor (m)	0.03
Sump Lining	Insulating Polymer Concrete
Sump Floor Temperature (°F)	70

**Resource Report 11- Reliability and Safety**

**Table 11.2.2.2-2**

**Flammable Vapor Exclusion Zones**

**AES Sparrows Point Project**

Methane Concentration	Exclusion Distance from Center of LNG Spill Containment Sump S-606 (ft)
Lower Flammability Limit (5%)	171
50% of LFL (2.5%)	262

**Resource Report 11- Reliability and Safety**

**Table 11.4.4-1**

**Potential Impacts to Commercial and Recreational Boaters  
AES Sparrows Point Project**

<b>Speed (knots)</b>	<b>Security Zone (yards)</b>	<b>Impact Time (minutes)</b>
20	500	1.97
15	500	2.63
10	500	3.95
5	500	7.9

**Notes:**

1. The table identifies the various scenarios based on a 1,000 foot ship and an assumed 500 yard security zone fore and aft of the vessel, which can be envisioned as a 4,000 foot long bubble.
2. Any such restriction would apply only to loaded inbound LNG vessels; there would be no security zone restrictions for the outbound LNG ships as they would no longer be carrying certain dangerous cargos.



**Resource Report 11- Reliability and Safety**

**Table 11.4.5-1**

**Marine Events Tracked by Sector Baltimore**

**AES Sparrows Point Project**

<b>Event Number</b>	<b>Date</b>	<b>Name of Event</b>	<b>Location</b>	<b>Potential Impact</b>
001-06	3/25/2006	Navy Crew vs. Princeton	Severn River	No
002-06	4/1/2006	27th Annual Safety at Sea Seminar	Severn River	No
035-06	4/1/2006	Nat'l Cherry Blossom Festival	Potomac River	No
003-06	4/8/2006	St. Mary's Seahawk Sprint (crew)	St. Mary's River	No
004-06	4/15/2006	Navy Crew vs. Georgetown	Severn River	No
011-06	4/16-20/06	Volvo Ocean Race Finish Leg 5	Chesapeake Bay – All the Volvo events occur once every 4 years. Last event held 2006.	Yes
059-06	4/19-9/6/06	AYC Weds Night Races	Severn River	No
005-06	4/22/2006	Navy Crew vs. Harvard	Severn River	No
040-06	4/22/2006	USNA-MRA Earth Day Project	Magothy River	No
006-06	4/23/2006	Navy Crew vs. Georgetown Women	Severn River	No
045-06	4/27-5/3/06	Baltimore Waterfront Festival (BWF) Downtown Sailing Centre	Inner Harbor	No
043-06	4/28-5/3/06	VX40 Regatta	Baltimore - Fort McHenry Channel	No
063-06	4/28-30/06	NAT'L Offshore One Design Regatta	Severn River	No
013-06	4/29/2006	Volvo Ocean Race in Port Race	Chesapeake Bay – East of Belvidere	No
060-06	4/29/2006	Baltimore Waterfront Festival (BWF) Demo Dragon Boat Races -	Inner Harbor	No
068-06	4/29-30/06	Watersport Products Mid-Atlantic Tour	Potomac River	No
042-06	4/30/2006	Rotary Club Regatta	Middle Branch	No
012-06	5/4/2006	Volvo Ocean Race Parade of Sail	Chesapeake Bay – every 4 years	Yes
038-06	5/4/2006	Baltimore Waterfront Festival (BWF) Blessing of the Fleet	Inner Harbor	No
036-06	5/6/2006	AVAM Kinetic Sculpture Race	Inner & Northwest Harbor	No
061-06	5/6/2006	Maryland Maritime Heritage Festival (MMHF) Dragon Boat Races	Spa Creek	No

**Resource Report 11- Reliability and Safety**

**Table 11.4.5-1**

**Marine Events Tracked by Sector Baltimore**

**AES Sparrows Point Project**

<b>Event Number</b>	<b>Date</b>	<b>Name of Event</b>	<b>Location</b>	<b>Potential Impact</b>
069-06	5/6/2006	MMHF Ports Optimist Regatta	Annapolis Harbor	No
076-06	5/6/2006	Ted Phoenix Championship Rowing Regatta	Anacostia River	No
070-06	5/7/2006	Baltimore Championship Regatta	Middle Branch Patapsco	No
062-06	5/7/2006	MMHF Challenge Boat Races	Annapolis Harbor	No
014-06	5/7/2006	Volvo Ocean Races Restart Leg 6 – every 4 years	Chesapeake Bay	Yes
020-06	5/12/2006	Navy Crew vs. Tigers	Severn River	No
041-06	5/13/2006	Occoquan Blessing of the Fleet	Occoquan River	No
052-06	5/13/2006	Baltimore County Waterfront Festival	Martin Lagoon	No
075-06	5/13/2006	Nat'l Capital Championship Rowing Regatta	Georgetown	No
054-06	5/19/2006	Preakness Eve Fireworks	Inner Harbor	No
071-06	5/20-21/06	Dragon Boat Festival	Georgetown	No
064-06	5/20/2006	USNA-MRA Earth Day Project	Severn River	No
007-06	5/21/2006	Patapsco River Swim	Patapsco River	Yes
023-06	5/21/2006	Solomons Blessing of the Fleet	Solomons	No
088-06	5/21/2006	Blessing of the Fleet	Washington DC	No
009-06	5/23-24/06	Blue Angels Air show – This event draws a very large crowd	Severn River	Yes
010-06	5/28/2006	Navy Crew vs. Wisconsin	Severn River	No
081-06	6/1/2006	EIPBN Conference Fireworks	Inner Harbor	No
099-06	6/1/2006	Port 300 Fireworks	Middle Branch	No
022-06	6/3/2006	13th Annual Potomac River Swim	Mouth of Potomac	No
100-06	6/3/2006	Stonewall Regatta	Anacostia River	No
101-06	6/3-4/2006	Monumental Outrigger Canoe	Georgetown	No
065-06	6/9/2006	Bermuda Ocean Race	Chesapeake Bay	Yes
072-06	6/10/2006	Potomac River Festival	Potomac River	No
105-06	6/10/2006	Potomac River Poker Run	Potomac River	No
110-06	6/10/2006	Chesapeake Bay Swim Poker Run – crosses the Patapsco	Chesapeake Bay	Yes
098-06	6/10-11/06	L.L. Bean Paddle Sports	Middle Chesapeake Bay	No
015-06	6/11/2006	Eagleman 70.3 Triathlon	Choptank River	No

**Resource Report 11- Reliability and Safety**

**Table 11.4.5-1**

**Marine Events Tracked by Sector Baltimore**

**AES Sparrows Point Project**

<b>Event Number</b>	<b>Date</b>	<b>Name of Event</b>	<b>Location</b>	<b>Potential Impact</b>
030-06	6/11/2006	The Great Chesapeake Bay Swim – The channel is closed throughout the event.	Chesapeake Bay	Yes
031-06	6/11/2006	Chesapeake Bay Challenge 1 Mile Swim	Chesapeake Bay	No
039-06	6/14/2006	National Pause for the Pledge – Fireworks display	Patapsco River	No
082-06	6/17/2006	Greenberg Fireworks	Inner Harbor	No
016-06	6/17/2006	15th Annual Maryland Swim	Chester River	No
032-06	6/17-18/06	Bo Bowman Memorial Regatta	Nanticoke River	No
034-06	6/17/2006	Alexandria Red Cross	Alexandria Channel	No
102-06	6/23-24/06	East Coast Olympic Canoe/Kayak Race	Upper Potomac River	No
084-06	6/24/2006	Charm City Sports	Middle Branch Patapsco River	No
044-06	6/24/2006	2ND AWA DC Freedom Run	Potomac River	No
050-06	6/24/2006	Hills Point Gang Vintage Regatta	Choptank River	No
106-06	6/24/2006	Not on the Fourth of July	Potomac River	No
111-06	6/24-25/06	Leukemia Poker Run	Chesapeake Bay	Yes
089-06	6/30/2006	AYC Build-A-Boat Event	Annapolis	No
094-06	6/30/2006	River Concert Series	St. Mary's River	No
080-06	7/1/2006	Marine Trade Assoc of Baltimore Fireworks	Middle River	No
079-06	7/1/2006	Golden Beach PKCA Fireworks	Patuxent River	No
115-06	7/1/2006	Herrington Harbor Marina Fireworks	Herring Bay	No
087-06	7/2/2006	Havre De Grace Fireworks	Susquehanna River	No
091-06	7/2/2006	Great Oak Landing Marine Fireworks	Fairlee Creek	No
092-06	7/2/2006	Somers Cove Marina	Somers Cove	No
027-06	7/2/2006	Independence Day Fireworks	Tred Avon River	No
024-06	7/3/2006	Salute to Cecil County Veterans	Northeast River	No
120-06	7/3/2006	Anne Arundel County Fireworks	Chesapeake Bay	No
093-06	7/3/2006	Sherwood Forest Fireworks	Severn River	No
078-06	7/3/2006	Chesapeake Beach Fireworks	Chesapeake Bay	No
095-06	7/4/2006	Georgetown Harbor Fireworks	Sassafras River	No
107-06	7/4/2006	Annapolis Fireworks	Spa Creek	No
085-06	7/4/2006	City of Cambridge Fireworks	Choptank River	No

**Resource Report 11- Reliability and Safety**  
**Table 11.4.5-1**  
**Marine Events Tracked by Sector Baltimore**  
**AES Sparrows Point Project**

<b>Event Number</b>	<b>Date</b>	<b>Name of Event</b>	<b>Location</b>	<b>Potential Impact</b>
055-06	7/4/2006	Solomon's Independence Day Fireworks	Patuxent River	No
073-06	7/4/2006	Colonial Beach 4th of July Fireworks	Potomac River	No
086-06	7/4/2006	Queen Anne's County Fireworks	Kent Island	No
056-06	7/4/2006	Baltimore 4th of July Fireworks	Inner & NW Harbor	No
116-06	7/4/2006	Galesville Heritage Society Fireworks	West River	No
113-06	7/4/2006	Green Hill Y. & C. C. Fireworks	Nanticoke River	No
074-06	7/7-9/2006	Windmill National Sailing Championship	Chester River	No
047-06	7/8/2006	Diamond in the Rough Triathlon	Susquehanna Entrance	No
118-06	7/8/2006	18th Annual Sail for Sight	Patapsco River down to White Rock	Yes
121-06	7/8/2006	Rick Lofgren Memorial Fireworks	South River	No
112-06	7/8/2006	USA & Alexandria Birthday Fireworks	Alexandria Channel	No
077-06	7/8/2006	Cadle Creek Community Fireworks	Rhode River	No
108-06	7/8-9/2006	Chesapeake Bay Log Canoe Races	Chester River	No
017-06	7/14-16/06	Admiral Byrd Regatta	Choptank River	No
119-06	7/15/2006	Central Poker Run	Upper Chesapeake Bay	No
083-06	7/15/2006	Vienna 300th Anniversary Fireworks	Nanticoke River	No
109-06	7/22/2006	Potomac River Jet Ski Poker Run	Potomac River	No
058-06	7/28-30/06	Cambridge Classic Powerboat Regatta	Choptank River	No
049-06	7/29/2006	Dinghy Poker Run	Middle River	No
051-06	8/5/2006	Asbury Solomons Rubber Duck Regatta	Patuxent River	No
053-06	8/5-6/2006	Thunder on the Narrows	Hogg Bay	No
029-06	8/11-13/06	Race to Oxford, Oxford Regatta. R-T-B Race	Choptank River	Yes, on the first day
096-06	8/25/2006	Queenstown Fireworks	Queenstown	No

**Resource Report 11- Reliability and Safety**

**Table 11.4.5-1**

**Marine Events Tracked by Sector Baltimore**

**AES Sparrows Point Project**

<b>Event Number</b>	<b>Date</b>	<b>Name of Event</b>	<b>Location</b>	<b>Potential Impact</b>
018-06	8/26/2006	Children's Miracle Network Fishing Tournament	Potomac River	No
025-06	9/2-3/2006	Ragin' on the River	Susquehanna River	No
037-06	9/2-3/2006	Kent Island Cup/MD Outrigger Challenge	Chesapeake Bay	No
104-06	9/8/2006	USS Constellation Turn-Around	Baltimore Harbor	No
103-06	9/9/2006	Town of Charlestown Fireworks	Northeast River	No
019-06	9/9/2006	Catholic Charities Dragon	Inner Harbor	No
090-06	9/16/2006	Chestertown 300th Anniversary Fireworks	Chester River	No
057-06	9/9/2006	Defenders Day Celebration Fireworks	Patapsco River	No
028-06	9/17/2006	45th Annual Hammond Memorial Race	Choptank River	No
021-06	9/23-24/06	4th Annual Cambridge Challenge	Choptank River	No
026-06	9/24/2006	Docking Contest	Solomons Harbor	No
066-06	9/30/2006	Forrest L. Wood (FLW) Outdoor Striper Series (1 OF 2)	Middle Chesapeake Bay	Yes
046-06	9/30/2006	General Smallwood Triathlon	Mattawoman Creek	No
117-06	9/30/2006	Chesapeakeman Ultra Triathlon	Choptank River	No
048-06	10/21/2006	Redbull Flugtag	Inner Harbor	No
114-06	10/21/2006	100th Anniversary Tug Baltimore Boat Parade	Baltimore Harbor	No
067-06	10/21/2006	FLW Outdoor Striper Series (2 of 2)	Choptank River	Yes
097-06	10/21/2006	Generations Fishing Tournament	Upper Chesapeake Bay	No
122-06	11/4/2006	2006 MRE Tug of War	Spa Creek	No
033-06	12/9/2006	Eastport Yacht Club Lights Parade	Spa Creek	No
008-06	Series	Maryland Youth Maritime Academy Training	Northwest	No

**Resource Report 11- Reliability and Safety**

**Table 11.4.5-2**

**Recurrent Marine Events in Sector Baltimore**

**AES Sparrows Point Project**

<b>Date</b>	<b>Event</b>	<b>Location</b>	<b>Possible Impact</b>
April to September	Baltimore County Yacht Association Tuesday Night	Fort McHenry Channel	No – Races are in Fort McHenry Channel north of
Late-April	National Offshore One Design (NOOD) Regatta	Mouth Of Severn River And Spa Creek	No – Regatta is at mouth of Severn River far from the shipping channel
Series	Annapolis Yacht Club (AYC) Wednesday Night Races	Mouth Of Severn River And Spa Creek	No - Races are held at mouth of river far from the shipping channel
3rd Sunday in May	Patapsco River Swim/Wade In	Mouth Of Patapsco River	Yes
Biennial in June	Annapolis To Newport Race (odd years)	Chesapeake Bay	Yes - This is a biennial event which rotates with the Annapolis to Bermuda race
Biennial in June	Annapolis To Bermuda (even years)	Chesapeake Bay	Yes - This is a biennial race which rotates with the
2 <sup>nd</sup> Saturday in June	Bay Swim Poker Run	West River To Kent Island	Yes
Mid-June	Offshore Performance Poker Run	Choptank River & Eastern Bay	No
Late-June	Leukemia Poker Run	Chesapeake Bay, Chester River To Fairlee Creek	Yes
Early-July	Annual Sail For Sight Regatta	Patapsco River	Yes
Mid-July	Central Poker Run	Severn, West, Miles & Wye Rivers	Yes
Mid-July	Screwpile Lighthouse Challenge	Chesapeake Bay, Mouth Of Patuxent River	No
July	U. S. Power Squadron Navigation Contest	Chesapeake Bay, Mouth Of Patuxent River	No
Early-August	Governor's Cup Yacht Race	Middle Chesapeake Bay Annapolis to St. Mary	Yes
Labor Day	Annual Kent Island Cup / Md Outrigger Challenge	Chesapeake And Eastern Bays Kent Narrows	No

**Resource Report 11- Reliability and Safety**  
**Table 11.4.5-2**  
**Recurrent Marine Events in Sector Baltimore**  
**AES Sparrows Point Project**

<b>Date</b>	<b>Event</b>	<b>Location</b>	<b>Possible Impact</b>
Mid-September	Tred Avon Yacht Club Annual Hammond Memorial Race	Chesapeake Bay (Oxford To Annapolis)	Yes
Mid-October	The Great Chesapeake Bay Schooner Race	Chesapeake Bay (Annapolis To Norfolk)	Yes
Mid-October	USS Constellation Cup	Patapsco River	Yes
Late-October	Baltimore County Yacht Club	Patapsco River – North of the Key Bridge	No